ejpmr, 2019,6(10), 385-388

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

INCORPORATING CLINICAL CASE SCENARIOS IN INTEGRATED TEACHING FOR FIRST-YEAR MBBS STUDENTS

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Article Received on 03/08/2019 **Article Revised on 23/08/2019** **Article Accepted on 13/09/2019**

ABSTRACT

This comparative, before-and-after study (without controls) was conducted at Rajiv Gandhi Medical College, Kalwa, Thane, Maharashtra State, India on two batches of first-year MBBS students to compare the scores obtained by two batches of first-year MBBS students after didactic lectures ("pre-test score") with that obtained after an educational intervention that combined integrated teaching with clinical case scenarios ("post-test score") to facilitate future changes in educational interventions. The outcome studied was the difference in cognitive domain scores after didactic lectures (by a pre-test) and after integrated teaching with clinical case scenarios (by a post-test). The inter-batch differences in scores were highly significant ($p<0.0001$) and the differences in pre-and post-test scores were also highly significant ($p<0.0001$). The gender differences in scores were not significant for both batches of first-year students. Integrated teaching with clinical case scenarios can boost the scores of students. Despite time constraints in the teaching schedule for the first-year MBBS course, integrated teaching with clinical case scenarios can be implemented to provide early clinical exposure.

KEY WORDS: Clinical case scenarios, Integrated teaching, MBBS.

INTRODUCTION

Integrated teaching (IT) requires combining of teaching material to inter-relate different aspects of the same topic, which is usually taught by separate academic departments. Horizontal integration involves synthesis of teaching in two or more disciplines taught concomitantly in the same phase of the curriculum, while vertical integration entails blending of topics between disciplines taught in the different phases of curriculum.[1] In vertical integration, the routine divide between pre-clinical and clinical sciences ceases to exist and basic sciences are represented unequivocally in the clinical curriculum and the learning of basic science is placed in the setting of clinical sciences, which is more relevant to students. Curriculum integration usually entails both horizontal and vertical integration. The process of curricular integration can take place at dissimilar rates and some topics are integrated more or less effortlessly, as compared to others.[2] Harden's "integration ladder" visualizes curricular integration as an eleven-step ladder. Subject-based isolated teaching comprises the lower four steps of the ladder. Increasing levels of cross-disciplinary integration correspond to the upper six steps. In the final eleventh step of the ladder, the student takes more responsibility for the integration and is provided with the requisite tools.[3]

IT saves time and efforts of teachers by coordinating dissemination of information on various subjects,[4] imparts learners with a holistic outlook and facilitates them to grasp new perspectives,[2] averts the attainment of bits of information in isolation and alters knowledge into handy tools for learning new know-how,[5] and enables applied learning and constructive clinical reasoning.[6] Defining the core curriculum, sequencing content, faculty proficiency and interdisciplinary integration are among the pre-requisites for teaching physiology in an integrated curriculum.[7] In integrated teaching, it is mandatory to include the "must know" basic science component of the curriculum.[8] IT between conventional subjects would provide medical students with holistic learning perspectives.[9] The topics for IT are typically chosen on the basis of interdisciplinary nature, preventability, and conditions that depict basic science concepts.[8] IT disseminates information from various disciplines and saves time and efforts of teachers.[4]

Currently, medical education in the Indian scenario is overwhelmed by emphasis on traditional didactic lectures, inadequate integration of course material and unsatisfactory coordination between the departments teaching basic and clinical sciences. Repetition of the same topics by teachers of various departments results in wastage of time and efforts. The challenges of undergraduate teaching in an integrated curriculum have been reported[10,11] and these include defining the core curriculum, sequencing content, faculty interest and expertise, and interdisciplinary integration.

Adult learners are willing to learn the subject matter only after they understand its relevance (termed "meaningful learning").[12,13] For first-year medical students, connecting details of basic sciences to clinical scenarios is facilitated by linking basic science topics to clinical problems. Knowledge is most effective when the organization of that knowledge matches the way in which the knowledge is to be used.[14] Teaching medical students about basic science in the context of clinical examples by means of integrated presentation of material can add to long-term retention and profound understanding. Clinical examples can assist students in differentiating aspects of basic science concepts that will be of help to them as they move forward to clinical postings.[15]

Early clinical exposure can facilitate first-year medical students to recognize applied aspects of basic sciences and to expand on that knowledge as they progress into clinical education.[16] Blending in actual or hypothetical clinical scenarios while teaching first-year medical students along the lines of clinical scenarios is a student-centred approach that renders learning into a delightful experience,[17] generates interest in a specific topic, assist in establishing a link among concepts, enhance long-term retention, assist recall of prior knowledge when required,[18] bridges the divergence between academic knowledge and its practical application,[19] and brings about deeper understanding among students.[16]

The objective of this study was to compare the scores obtained by two batches of first-year MBBS students after didactic lectures ("pre-test score") with that obtained after an educational intervention that combined integrated teaching with clinical scenarios ("post-test score") to enable changes in educational intervention in future.

MATERIALS AND METHODS

This comparative, before-and-after study (without controls) was conducted from 2017 to 2018 at Rajiv Gandhi Medical College, Kalwa, Thane, Maharashtra State, India. The participants included two batches (2017 and 2018 batches) of first-year MBBS students, of either sex, who gave written informed consent. Those students who did not give written informed consent or those who were absent during the didactic lectures, or the educational intervention, or pre-test or post-test were excluded.

Written informed consent was obtained from those willing to participate in the study. After curriculum-based didactic lectures were delivered on the central nervous system, the students took a pre-test comprising ten questions (two marks per question; total 20 marks). After the pre-test, the participants attended an educational intervention using a combination of integrated teaching with clinical scenarios on the same topic. Subsequently, the post-test was administered using a questionnaire that was identical to that of the pre-test. The educational intervention, the teachers, the pre- and post-test questions were identical for 2017 and 2018 batches. The outcome studied was the difference in cognitive domain scores after didactic lectures (by a pre-test) and after educational intervention (by a post-test).

The data were entered in Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and presented as mean and standard deviation (SD). 95% Confidence interval (CI) was calculated using the formula: [Mean-(1.96)*Standard Error)] - [Mean+(1.96)*Standard Error)]. EpiInfo Version 7.0 (public domain software package from the Centers for Disease Control and Prevention, Atlanta, GA, USA) was used for statistical analyses. The standard error of difference between two means and paired 't' values were calculated. Statistical significance was determined at $p<0.05$.

RESULTS AND DISCUSSION

A total of 62 students (28 females; 45.16% & 34 males; 54.84%) from 2017 batch and 60 students (30 females; 50% & 30 males; 50%) from 2018 batch participated in the study.

Inter-batch variation in overall pre- and post-test scores

Table 1: Inter-batch differences in overall pre- and post-test scores.

Parameters	Pre-test		Post-test	
	2017 Batch (n=62)	2018 Batch (n=60)	2017 Batch (n=62)	2018 Batch (n=60)
Mean	14.32	6.77	19.94	18.47
SD	1.51	3.22	0.24	2.88
95% CI	13.95 - 14.70	5.95 - 7.58	19.88 - 20.00	17.74 - 19.20
Z value	16.491	3.940		
'p' value	<0.0001 *	<0.0001 *		

*SD = Standard deviation; CI = Confidence interval; * Highly significant;*
Z=Standard error of difference between two means

The differences in the pre-test as well as post-test scores for 2017 and 2018 batches were highly significant (Table-1).

Pre- and post-test differences in scores

The differences in the pre-test as well as post-test scores for 2017 batch (Table-2) and 2018 batch (Table-3) were highly significant.

Table 2: Pre- and Post-test differences in scores (2017 Batch).

Parameters	Females (n=28)		Males (n=34)	
	Pre-test	Post-test	Pre-test	Post-test
Mean	14.64	19.89	14.91	19.85
SD	1.37	0.31	1.66	0.36
95% CI	14.14 - 15.15	19.79 - 20.00	14.35 - 15.47	19.73 - 19.97
Paired 't' value	19.777		16.958	
'p' value	<0.0001 *		<0.0001 *	

*SD = Standard deviation; CI = Confidence interval; * Highly significant*

Table 3: Pre- and Post-test differences in scores (2018 Batch).

Parameters	Females (n=30)		Males (n=30)	
	Pre-test	Post-test	Pre-test	Post-test
Mean	6.70	18.53	6.83	18.40
SD	3.43	2.92	3.05	2.90
95% CI	5.47 - 7.93	17.49 - 19.58	5.74 - 7.93	17.36 - 19.44
Paired 't' value	14.384		15.057	
'p' value	<0.0001 *		<0.0001 *	

*SD = Standard deviation; CI = Confidence interval; * Highly significant*

Gender differences in scores

In the present study, the gender differences in scores were not significant for both 2017 (Table-4) and 2018 batches (Table-5). Several studies[20-24] have reported gender differences in learning styles.

Table 4: Gender differences in scores (2017 Batch).

Parameters	Pre-test		Post-test	
	Females (n=28)	Males (n=34)	Females (n=28)	Males (n=34)
Mean	14.64	14.91	19.89	19.85
SD	1.37	1.66	0.31	0.36
95% CI	14.14 - 15.15	14.35 - 15.47	19.79 - 20.00	19.73 - 19.97
Z value	0.701	0.469		
'p' value	0.482	0.638		

SD = Standard deviation; Z=Standard error of difference between two means; CI = Confidence interval

Table 5: Gender differences in scores (2018 Batch).

Parameters	Pre-test		Post-test	
	Females (n=30)	Males (n=30)	Females (n=30)	Males (n=30)
Mean	6.70	6.83	18.53	18.40
SD	3.43	3.05	2.92	2.90
95% CI	5.47 - 7.93	5.74 - 7.93	17.49 - 19.58	17.36 - 19.44
Z value	0.155	0.173		
'p' value	0.876	0.862		

SD = Standard deviation; Z=Standard error of difference between two means; CI = Confidence interval

CONCLUSION

A combined method of educational intervention can increase the scores of students. Despite time constraints in the teaching schedule for the first-year MBBS course, integrated teaching with case scenarios can be put into operation to provide early clinical exposure.

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